REMARKS/AGRUMENTS

Reconsideration of this application, as amended, is respectfully requested. The following remarks are responsive to the Office action mailed September 23, 2004.

Claims 1-27 are pending.

Claims 1-8, 10-17, and 19-26 stand rejected.

Claims 9, 18, and 27 are objected to.

Claims 1, 10, and 19 have been amended. It is respectfully submitted that no new matter has been added.

Claims 1 and 19 are rejected under 35 U.S.C. §102(a) as being anticipated by Duesterwald, et al., "Software Profiling for Hot Path Prediction: Less is More", ACM 2000. (hereafter, "Duesterwald").

Claims 1 and 19 are rejected under 35 U.S.C. §102(b) as being anticipated by Conte, et al., "Using Branch Handling Hardware to Support Profile-Driven Optimization", ACM 1994. (hereafter "Conte").

Claims 1-8, 10-17, and 19-26 are rejected under 35 U.S.C. §103(a) as being unpatentable over Wu et al., "An Efficient Software-Hardware Collaborative Profiling Technique for Wide-Issue Processors," October 1999 (hereafter, "Wu") in view of Conte.

CLAIM REJECTIONS

35 USC §102 (a)

The Examiner rejected Claims 1 and 19 under 35 U.S.C. §102(a) as being anticipated by Duesterwald. Applicant submits that claims 1 and 19 are not anticipated by Duesterwald. In regard to the rejection of claim 1, the Examiner has stated in part that:

> Duesterwald discloses "A method comprising: performing repeatedly edge profiling on a program; detecting profile phase transitions repeatedly(Re:

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Duesterwald: See page 204, §3. and also see p. 210, §6.1); and optimizing the program based upon the profile phase transitions and edge profile..."
(3/11/04, Office Action, pp. 3-4)

The Applicant respectfully submits that claim 1 is not anticipated by Duesterwald.

Independent claim 1, as amended, recites "detecting profile phase transitions repeatedly, **wherein a profile phase transition is an indication that one or more cold program edges have become a corresponding number of hot program edges.**" The Applicant respect respectfully submits that is feature is not disclosed by Duesterwald.

In addition, Claim 1 recites the feature of *performing repeatedly edge profiling on a program **using hardware and software**....* (Emphasis added) This feature is not disclosed by Duesterwald. Duesterwald uses an all software approach to perform path profiling. In fact, Duesterwald states "we delivered a new low-overhead software profiling scheme for hot path prediction. (Duesterwald, p. 202, abstract) Duesterwald discusses the shortcomings of prior hardware schemes and the benefits of her software scheme. More particularly, she sates "a straitforward approach to implement an online prediction scheme in **software** is to adapt an existing offline path profiling scheme...." (Duesterwald, p. 203, §1) Furthermore, Duesterwald does not describe ***directly measuring** branch execution frequencies over an **entire execution** of the program*, as claimed by applicant. Particularly, Duesterwald describes software profiling for hot path prediction. (Duesterwald, title) Additionally, Duesterwald states "the goal of hotpath prediction is to predict what will be one of the most frequently executing paths based on a *limited amount of execution history*." (Duesterwald, p. 204, §3) Thus, Duesterwald ultimately predicts which paths will be most frequently executed based on the limited execution history gathered during the period required to reach the hotpath threshold execution value.

For at least these reasons, Duesterwald does not disclose "*performing repeatedly edge profiling on a program **using hardware and software**, including **directly measuring branch execution frequencies** over an **entire execution** of the program*" and "*detecting profile phase transitions repeatedly, **wherein a profile phase transition is an indication that one or more cold***

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program edges have become a corresponding number of hot program edges," as recited in

claim 1. (emphasis added) Because, Duesterwald does not disclose the features recited in claim

1, the Applicant respectfully submits that claims 1 and claims 2-5 which depend from claim 1 are

not anticipated under 35 U.S.C. §102(a) by Duesterwald.

The Examiner also rejected in claim 19 under 35 U.S.C. §102(a) for the reasons set forth

in the rejection of claim 1. Claim 19 discloses substantially similar features as claim 1, and

recites *performing repeatedly edge profiling* on a program over an *entire execution of the*

program and *"detecting profile phase transitions repeatedly, wherein a profile phase transition*

is an indication that one or more cold program edges have become a corresponding number of

hot program edges." (Emphasis added) Because, Duesterwald does not disclose this feature as

taught by applicant for the reasons discussed above with regard to claim 1, applicant respectfully

submits that claim 19 and claims 20-27 which depend from claim 19 are not anticipated under 35

U.S.C. §102(a) by Duesterwald.

35 USC §102 (b)

The Examiner rejected claims 1 and 19 under 35 U.S.C. §102(b) as being anticipated by

Conte. Applicant submits that claims 1 and 19 are not anticipated by Conte. In regard to the

rejection of claim 1, the Examiner has stated in part that:

> Conte discloses "A method comprising: performing repeatedly edge profiling on
> a program; detecting profile phase transitions repeatedly(Re: Conte: See page
> 204, §3. and also see p. 210, §6.1); and optimizing the program based upon the
> profile phase transitions and edge profile..."
> (3/11/04, Office Action, p. 4)

Applicant respectfully submits that claims 1 and 19 are not anticipated by Conte. Claim

1, as amended, recites the feature of *detecting profile phase transitions repeatedly, wherein a*

profile phase transition is an indication that one or more cold program edges have become a

corresponding number of hot program edges." (Emphasis added) This feature is not disclosed

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by Conte. Conte describes a method for obtaining profile information without significant run-time slow-down. (Conte, pp. 12-13). Conte discusses several hardware branch prediction mechanisms. The goal of Conte's paper is to demonstrate that the contents of hardware branch buffers can be used to add weights to a statically – built control flow graph (CFG). (Conte, p.14, § 3) The weights indicate which traces are analyzed. (Conte, p.16, § 3.4). Conte's **Figure 4** shows a comparison of "actual profiles" to "estimated profiles". The comparison results in certainty values, such as the percentage probability that the estimated profiles are correct. The only use of Conte's **Figure 4** is to validate the use of estimated profiles. The transition from block 7 to 8 shown in **Figure 4** and described at page 16, §3.4 describes transitions between blocks along an execution path, **not** profile phase transitions. For at least these reasons, Conte does not disclose *detecting profile phase transitions repeatedly, wherein a profile phase transition is an indication that one or more cold program edges have become a corresponding number of hot program edges,"* as recited claim 1. (emphasis added) Because, Conte does not disclose this feature taught by applicant's claim 1, applicant respectfully submits that claims 1 and claims 2-5 which depend from claim 1 are not anticipated under 35 U.S.C. §102(b) by Conte.

The Examiner also rejected in claim 19 under 35 U.S.C. §102(b) for the reasons set forth in the rejection of claim 1. Claim 19 discloses substantially similar features as claim 1, and recites *detecting profile phase transitions repeatedly*. (Emphasis added) Because, Conte does not disclose this feature as taught by applicant for the reasons discussed above with regard to claim 1, applicant respectfully submits that claim 19 and claims 20-27 which depend from claim 19 are not anticipated under 35 U.S.C. §102(b) by Conte.

CLAIM REJECTIONS – 35 USC §103 (a)

The Examiner has rejected claims 1-8, 10-17, and 19-26 under 35 U.S.C. §103(a) as being

unpatentable over Wu in view of Conte. The Manual of Patent Examining Procedure ("MPEP"),

in § 706.02(j), states:

> To establish a *prima facie* case of obviousness, three basic criteria must be met.
> First, there must be some suggestion or motivation, either in the references themselves or
> in the knowledge generally available to one of ordinary skill in the art, to modify the
> reference or to combine reference teachings. Second there must be a reasonable
> expectation of success. Finally, **the prior art reference** (or references when combined)
> **must teach or suggest all the claim limitations**. The teaching or suggestion to make the
> claimed combination and the reasonable expectation of success must be both found in the
> prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d
> 1438 (Fed. Cir. 1991).

(Emphasis added). Thus, the MPEP and applicable case law require that a combination of

references teach or suggest all of the claim limitations of rejected claims to sustain an

obviousness rejection under 35 U.S.C. § 103.

Amended claims 1 and 19 recite, in part,:

> detecting profile phase transitions repeatedly, <u>wherein a profile phase transition
> is an indication that one or more cold program edges have become a
> corresponding number of hot program edges</u> ....

(Emphasis added). Claim 10 is a system claim that similarly recites a profile phase transition,

"wherein a profile phase transition is an indication that one or more cold program edges have

become a corresponding number of hot program edges."

Regarding the above-shown claim limitations, the Office action states, in part, that "Wu

does not particularly address phase transitions." Thus, the Applicant and the Office action agree

that Wu does not teach or suggest "detecting profile phase transitions," as recited in claim 1. The

Office action further directs the Applicant's attention to page 14, lines 23-24, wherein Conte

demonstrates that the contents of hardware branch buffers can be used to add weights to a

statically-built control flow graph (see, e.g., Conte, page 14, section 3). As shown above,

however, Conte does not teach or suggest a profile phase transition, "<u>wherein a profile phase</u>

<u>transition is an indication that one or more cold program edges have become a corresponding</u>

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number of hot program edges," as recited in claims 1, 10, and 19 (emphasis added). The

Applicant respectfully submits that no combination of Wu and Conte renders claims 1, 10, and 19

obvious for at least the reason that neither Wu nor Conte teach or suggest a profile phase

transition, "wherein a profile phase transition is an indication that one or more cold program

edges have become a corresponding number of hot program edges."

Claims 2-9 depend from claim 1, claims 11-18 depend from claim 10, and claims 20-27

depend from claim 19. For at lest the reason that dependent claims include the limitations of the

claims from which they depend, the Applicant submits that claims 2-9, 11-18, and 20-27 are not

rendered obvious by Wu in view of Conte.

CONCLUSION

In view of the foregoing, it is believed that all claims now pending (1) are in proper form,

(2) are neither obvious nor anticipated by the relied upon art of record, and (3) are in condition

for allowance. A Notice of Allowance is earnestly solicited at the earliest possible date. If the

Examiner believes that a telephone conference would be useful in moving the application forward

to allowance, the Examiner is encouraged to contact the undersigned at (503) 439-8778.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies,

to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional

fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly, extension of time fees.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: December 22, 2004 _____
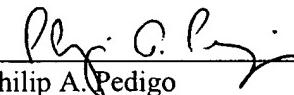
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